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Dairy Cows' Welfare Assessment in a Farm from South-Eastern Romania

Florin FURNARIS*, Oana Margarita GHIMPETEANU, Gabriel PREDOI

University of Agronomic Sciences and Veterinary Medicine of Bucharest – Faculty of Veterinary Medicine, 105 Splaiul Independentei, District 5, 050097, Bucharest, Romania

Abstract

This study aimed to assess the welfare level of dairy cows in a farm from the South-Eastern Romania, in a mixed house with free-stalls inner space division. The welfare level was established by using an integrative numerical assessment system – the Austrian Animal Needs Index 35L/2000. There were scored 26 objective welfare indicators within the five areas of influence: locomotion, social interactions, flooring, light and air, stockmanship. In order to assess and score some indicators, there were used modern devices (LX 1102 light meter, Drager Pac 7000 ammonia analyzer, Testo 405 V1 thermo-anemometer, SL 4012 sound meter). Moreover, for increasing the objectivity in measuring and scoring animal cleanliness within the fifth area on influence there was used Hygiene Score Card. Analyzing the results, it could be noticed that the highest scored indicators were those within the Locomotion and Social interactions areas (as expected, considering the loose-system applied in the studied farm). The lowest scored areas were Flooring and Light and air, the critical indicators being light (uneven lighting and some low intensity values: 28-30 Lx) and outdoor areas cleanliness, resulting in poor animal cleanliness. In spite of the mentioned negative aspects, the overall ANI 35L score (30.5 points) reflects a good welfare, but the score could be validated on the condition that the light in the shelter is corrected. Addressing this issue along with the cleanliness of the outdoor areas may improve the welfare level to the excellent rating and may also increase the milk production.

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Keywords: dairy cows; welfare level; areas of influence; ANI 35L

1. Introduction

* Corresponding author. Tel.: +4031-433-4250; Fax: +4021-318-0466.
E-mail address: ffurnaris@gmail.com

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Lately, it has been registered worldwide an increasing of general public interest regarding animal welfare in farms, research facilities, during transportation and slaughter etc. Under the constant pressure of public opinion, non-governmental organization for animals' protection, and media upon European and national authorities or legislative structures, the animal welfare standards continuously evolved and improved, become more and more strict. Animal rearing systems and technologies with no respect with animal welfare issue disappeared or had become obsolete (tether-system of animal housing, non-enriched cages in laying hens). Nowadays, the entire society understands that animal husbandry cannot be conceived without a good welfare level of animals – an essential condition for a higher production, but also a moral duty of man regarding the animals (Thewis and Galiş, 2012).

According to the most accepted definition – in fact an operational definition (Broom, 1986) "welfare of an individual is its physiological and psychological state as regards its attempts to cope with its environment". In this perspective, the animal welfare could largely vary from very poor to excellent and could be objectively assessed on scientific basis.

Among the large number of animal welfare assessment methods (Winckler, 2014), the most recommended are the integrative numeric systems – which combine physiological welfare indicators, ethological indicators and ecological ones (animal housing conditions), approaching thus all the animal welfare inputs with an unique output – animal welfare level. The greatest advantage of such systems is that the welfare of animals at group level is obtained as a score – a numeric value, so that comparing animals' welfare levels between different farms or different rearing conditions become possible. An example of such a system, which emphasizes the housing conditions (Bartussek et al., 2000), is the Austrian system Animal Needs Index 35 (ANI 35), whose version 35L/2000 is used in this study for assessing the welfare level in a farm of dairy cows from South-Eastern Romania.

2. Materials and methods

The study was conducted in February 2016, in a farm of dairy cows from Montbeliard race reared in loose-system, in a mixed shelter of 65.7 m/8.9 m - with mixed wind-driven ventilation and mixed lighting. The natural light was assured by 25 windows of 1.20 m/0.86 m on each longitudinal wall of the shelter and the artificial light by 30 fluorescent light tubes of 40W placed on two rows. The 22 dairy cows are housed in a pen which had 41.7 m/ 5.90 m (fig. 1), with a lying area divided in free-stalls (of 245 cm length/120 cm width/125 cm height of neck rail) and an area for movement-feeding-manure collecting and discharging with scraper chain conveyor. The assured feeding space was 68 cm per cow and the watering space of 7.43 cm per cow.

Fig. 1. Inner space division in the dairy cows' shelter

In compliance with ANI 35L/2000 welfare assessment system for dairy cows, we followed and scored 26 objective welfare indicators grouped within five areas of influence: locomotion, social interactions, flooring, light and air, stockmanship. For rating and scoring the indicators belonging to the forth area of influence – light an air – there were used modern devices: LX 1102 light meter for measuring light intensity and establishing light uniformity, Drager Pac 7000 ammonia analyzer for establishing air quality, Testo 405 V1 thermo-anemometer for measuring the draughts speed in the lying area, SL 4012 sound meter for establishing the sound level). In addition, for increasing

the accuracy in scoring some indicators within the fifth area of influence – stockmanship – as animal cleanliness and condition of hooves, there were used numeric assessment tool as Hygiene Score (Cook, 2002) and Gait Score (Sprecher, 1997).

3. Results and discussions

In the first area of influence – locomotion – there were assessed space allowance; lying down and rising; access to outdoor areas (days/year).

The usable space for dairy cows in the studied shelter had a value of 7.27 sqm/AU (animal unit = 500 kg body weight), so the score awarded was 2.5 points.

Lying down and rising was considered comfortable, the free-stall dimensions being suitable with cows height and body length and being not noticed abnormal lying down or rising behavioral patterns. Thus, the awarded score was 3 points.

Animals have a good access to outdoor areas – respectively to a yard which offers 25.4 sqm/AU for an average interval of 250 days/ year (a value higher than the reference value of 230 days/year) – so the score awarded for this indicator was 2.5 points.

We appreciate that the dairy cows have very good possibilities for locomotion, the total score for this first area of influence being 8 points from a maximum of 10.5 points that could be awarded according to the assessment sheet.

In the second area of influence – social interactions – there were assessed space allowance; herd structure; management of young; access to outdoor areas (days/year).

Space allowance was 8.4 sqm/AU, the awarded score being 3 points. For this indicator within the second area of influence, unlike the space allowance within the first area of influence the entire surface of the free-stall is taken into account, not just a half.

Herd structure is scored with 1 point, for stable age/production group.

Management of young is scored with 0.5 points, all the calves and young having origin in the own farm and being housed in a separate building.

For access to outdoor areas the score awarded was 2 points, according to the assessment sheet.

The total score for the second area of influence is 6.5 points from a maximum of 9 points that could be awarded.

In the third area of influence – flooring – there were approached lying area properties: softness, cleanliness and slipperiness; activity areas properties; flooring in outdoor areas.

The softness for lying area was scored with 1.5 points, the floor being covered with soft rubber matting. The cleanliness of this area was appreciated as medium and was scored with 0.5 points, while slipperiness was scored with 1 point for good grip.

In the activity areas, the floor had good grip, was technically impeccable and not harmful to hooves so it is scored with 1 point.

The outdoor area was slippery and soiled (fig. 2), so it receives 0 points. Moreover, it could be noticed the lack of facilities in the paddock (drinking bowl, sun/wind protection) and deficiencies in manure discharging.

The total score for the third area of influence is 4 points from a maximum of 8 points that could be awarded.

In the fourth area of influence – light and air – there were assessed daylight in the animal shelter; air quality; draughts in the lying area; noise; access to outdoor areas in days/year; average number of hours of daily outdoor access.

Concerning the light in the cows' shelter, it had been noticed that, although the shelter natural light index was good (the percentage of windows area relative to floor area being of 8.7) and the average value of light intensity was 52-53 Lux (Lx), the lighting is insufficient and uneven, in some sampling points being recorded a light intensity values of 28-30 Lx. Such figures, lower than the minimum recommended standards, could be explained by the reduced transparence of mixed functionality (light and air change) openings placed on the longitudinal wall facing west. Moreover, the artificial light during the time of assessment visit was also at low intensity (0.62 W/sqm) because not all the fluorescent tubes were turned on. Considering all the aspects presented, we rate the light in the shelter as medium and we are scoring it with 0.5 points, with the specification that this score, as well as the overall ANI 35L score, must be considered as provisory, until the correction of the light deficiency in the shelter at least to the minimum recommended welfare standards.

Fig. 2. Aspects from the paddock

Air quality in the shelter was rated as optimal and was scored with 1.5 points, the manure collection being efficient, the air volume being of 10.86 cbm/100 kg animal body weight and the ammonia concentration not exceeding 1 ppm.

The indicator draughts in the lying area was scored with 0.5 points, in this critical area draughts speed having negligible values (0.08 m/s) and rarely higher values (up to 0.3-0.4 m/s).

Noise in the shelter was scored with 1 point, considering the facts that the shelter had natural (wind-driven) ventilation and the average sound intensity was 25-28 decibels.

The indicator access to outdoor areas in days/year received a score of 2 points and the indicator average number of hours of daily outdoor access received a score of 1 point (the value being of 5 hours/day).

The total score for the fourth area of influence is 6.5 points from a maximum of 9.5 points that could be awarded.

In the last area of influence – stockmanship – there were assessed cleanliness of pens, feeding/drinking areas; technical condition of equipment; condition of integument; cleanliness of animals; condition of hooves; technopathies; animal health.

The pens, drinking/feeding area were rated as clean - the score received being of 1 point.

The technical condition of equipment was rated as medium, the score being of 0.5 points.

Condition of integument was good and received 1 point.

Regarding the cleanliness of animals, the average Hygiene Score having a value of 3.17 (soiled animal), obviously because the lack of hygiene in the outdoor area. The awarded score was - 0.5 points.

The hooves condition was rated as perfect and received 1.5 points.

For technopaties the score was 1 point and for animal health the score was 1 point (good animal health).

The total score for the fifth area of influence is 5.5 points from a maximum of 8 points that could be awarded.

Analyzing the results, it could be noticed that the highest scored indicators were those within the Locomotion and Social interactions areas (as expected, considering that in the farm dairy cows are housed in loose-system, on free-stalls). The lowest scored areas were Flooring and Light and air, the critical indicators being daylight and outdoor areas flooring, resulting in poor animal cleanliness (table 1 and fig. 3).

Table 1.ANI 35L scores for each area of influence and the overall ANI 35L score in relation with max. scores

Specification	Given score	Max. awardable score
Locomotion	8	10.5
Social interactions	6.5	9
Flooring	4	8
Light and air	6.5	9.5
Stockmanship	5.5	8
Overall ANI 35L score	**30.5**	**45**

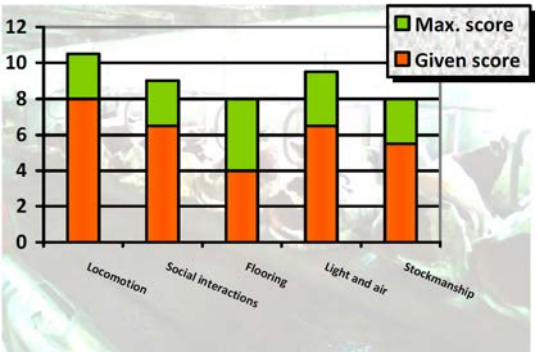

Fig. 3. ANI 35 score for the assessed shelter compared to the maximum awardable score

Compared to other farms where it was established dairy cows' welfare level by using ANI 35 assessment system in different housing systems and in different areas of our country (Popescu, 2009; Mitranescu, 2012), animals' welfare in the present farm was better, the overall ANI score being with 6.5 to 20 points higher. The explanation resides in good space allowance and the great interval of outdoor access, these indicators representing a high share in the overall ANI score.

However, the overall score in the present farm cannot be validated until the correction of the house lighting.

4. Conclusions

The welfare level of the cows in the studied farm is good according to the overall ANI 35L score (30,5 points).

However, this welfare rating is considered provisory until the correction of light in the shelter. In addition, improving the house lighting and the cleanliness of the outdoor areas may improve the welfare level to the excellent rating and may also increase the milk production.

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